IXYS

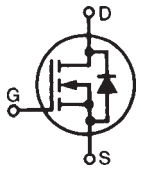
Preliminary Technical Information

Polar™ Power MOSFET HiPerFET™

IXFL38N100P

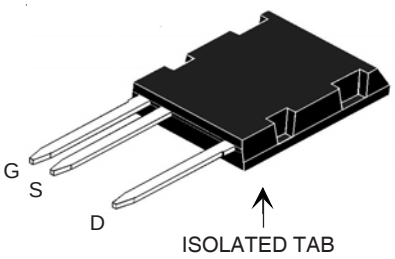
V_{DSS} = 1000V
I_{D25} = 29A
$R_{DS(on)}$ ≤ 230mΩ
t_{rr} ≤ 300ns

(Electrically Isolated Tab)



N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode

ISOPLUS i5-Pak™ (HV)



G = Gate D = Drain
S = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	1000	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	1000	V
V_{GSS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	T_C = 25°C	29	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	120	A
I_A	T_C = 25°C	19	A
E_{AS}	T_C = 25°C	2	J
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	15	V/ns
P_D	T_C = 25°C	520	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
V_{ISOL}	50/60 Hz, RMS, 1 minute	2500	V~
	$I_{ISOL} \le$ 1mA t = 1s	3000	V~
F_C	Mounting Force	40..120/4.5..27	N/lb.
Weight		8	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 3mA	1000			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 1mA	3.5		6.5	V
I_{GSS}	V_{GS} = ± 30V, V_{DS} = 0V			± 300	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			50	μA
	T_J = 125°C			4	mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 19A, Note 1			230	mΩ

Features

- Silicon Chip on Direct-Copper-Bond Substrate
  - High Power Dissipation
  - Isolated Mounting Surface
  - 2500V Electrical Isolation
- International Standard Packages
- miniBLOC, with Aluminium Nitride Isolation
- Low Drain to Tab Capacitance(<30pF)
- Rugged Polysilicon Gate Cell Structure
- Avalanche Rated
- Fast Intrinsic Diode

Advantages

- Easy Assembly
- Space Savings
- High Power Density

Applications

- Switched-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- Laser Drivers
- AC and DC Motor Drives
- Robotics and Servo Controls

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Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	V_{DS} = 20V, I_D = 19A, Note 1	18	29	S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		24	nF
C_{oss}			1245	pF
C_{rss}			80	pF
R_{Gi}	Gate input resistance		0.78	Ω
$t_{d(on)}$	**Resistive Switching Times**		74	ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 19A		55	ns
$t_{d(off)}$	R_G = 1Ω (External)		71	ns
t_f			40	ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 19A		350	nC
Q_{gs}			150	nC
Q_{gd}			150	nC
R_{thJC}				0.24 °C/W
R_{thCS}			0.15	°C/W

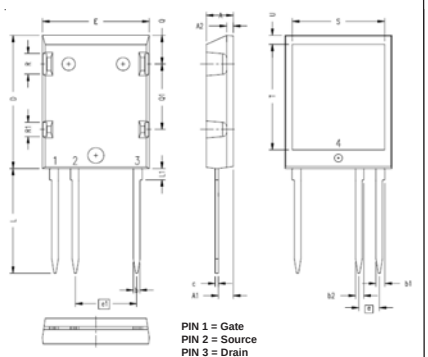
Source-Drain Diode (T_J = 25°C Unless Otherwise Specified)		Characteristic Values Min.	Typ.	Max.
I_S	V_{GS} = 0V			38 A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			150 A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5 V
t_{rr}	I_F = 25A, -di/dt = 100A/μs			300 ns
Q_{RM}	V_R = 100V, V_{GS} = 0V		2.5	μC
I_{RM}			17	A

Note 1. Pulse test, t ≤ 300μs; duty cycle, d ≤ 2%.

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

ISOPLUS i5-Pak™ HV (IXFL) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETER MIN	MILLIMETER MAX
A	0.190	0.205	4.83	5.21
A1	0.102	0.118	2.59	3.00
A2	0.046	0.055	1.17	1.40
b	0.045	0.055	1.14	1.40
b1	0.063	0.072	1.60	1.83
b2	0.058	0.068	1.47	1.73
c	0.020	0.029	0.51	0.74
D	1.020	1.040	25.91	26.42
E	0.770	0.799	19.56	20.29
e	0.150 BSC		3.81 BSC	
e1	0.450 BSC		11.43 BSC	
L	0.780	0.820	19.81	20.83
L1	0.080	0.102	2.03	2.59
Q	0.210	0.235	5.33	5.97
Q1	0.490	0.513	12.45	13.03
R	0.150	0.180	3.81	4.57
R1	0.100	0.130	2.54	3.30
S	0.668	0.690	16.97	17.53
T	0.801	0.821	20.34	20.85
U	0.065	0.080	1.65	2.03

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ 25ºC

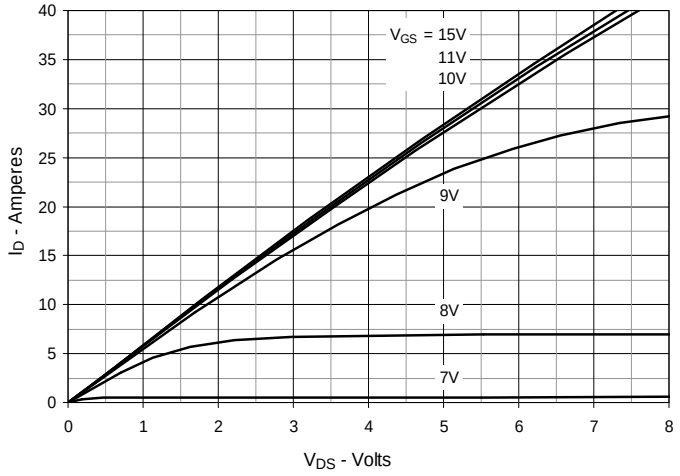


Fig. 2. Extended Output Characteristics @ 25ºC

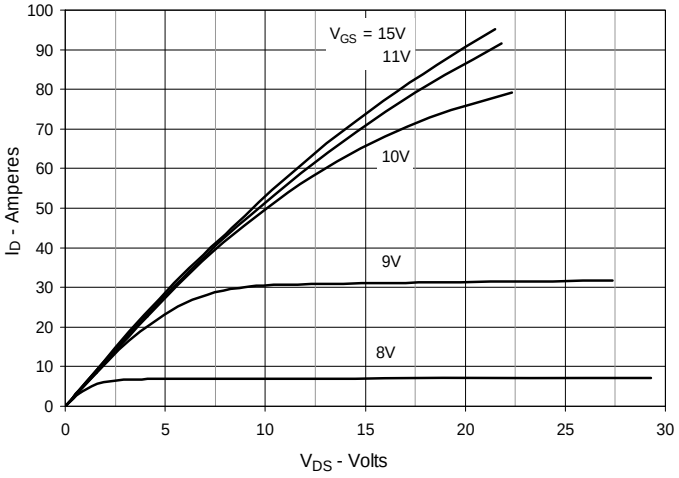


Fig. 3. Output Characteristics @ 125ºC

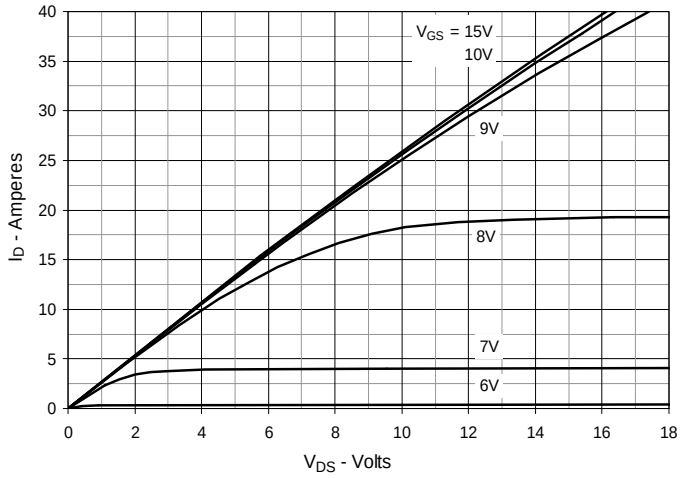


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 19A Value vs. Junction Temperature

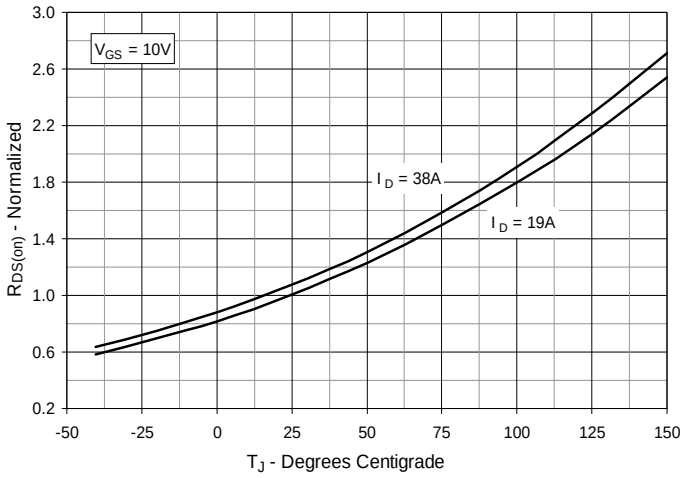


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 19A Value vs. Drain Current

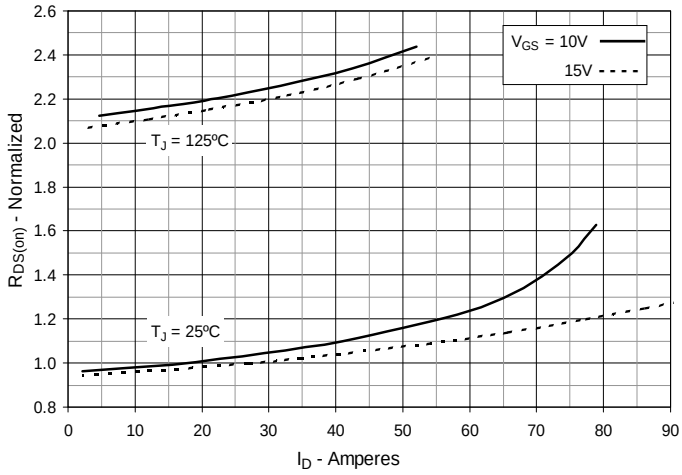


Fig. 6. Maximum Drain Current vs. Case Temperature

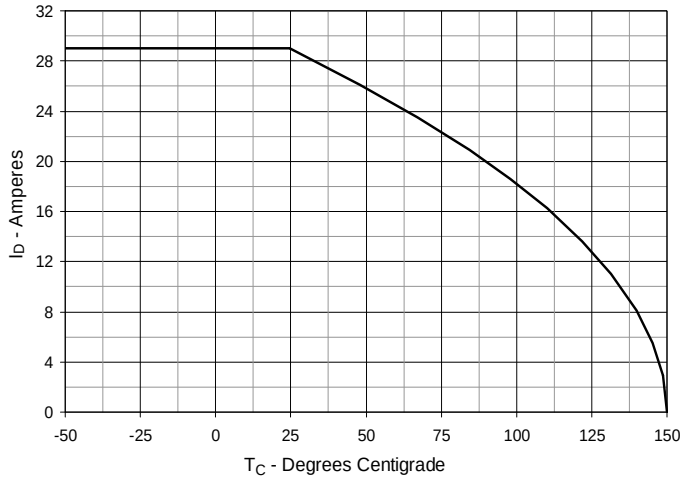


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Fig. 7. Input Admittance

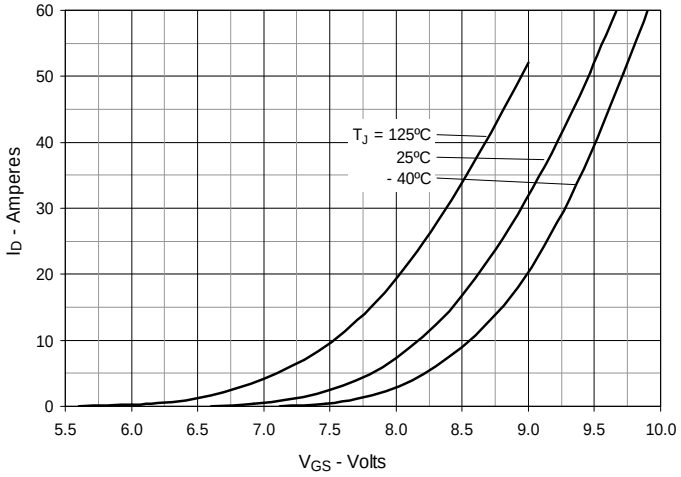

Fig. 8. Transconductance

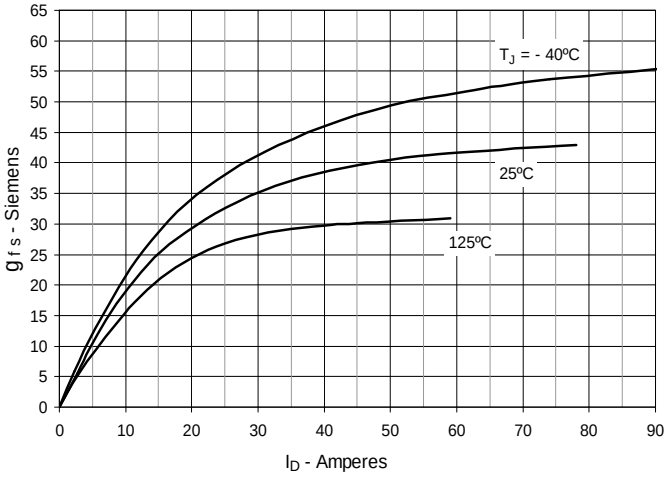

Fig. 9. Forward Voltage Drop of Intrinsic Diode

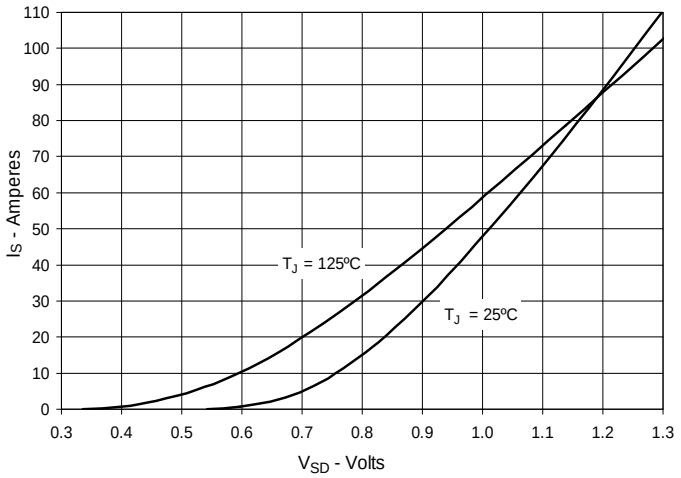

Fig. 10. Gate Charge

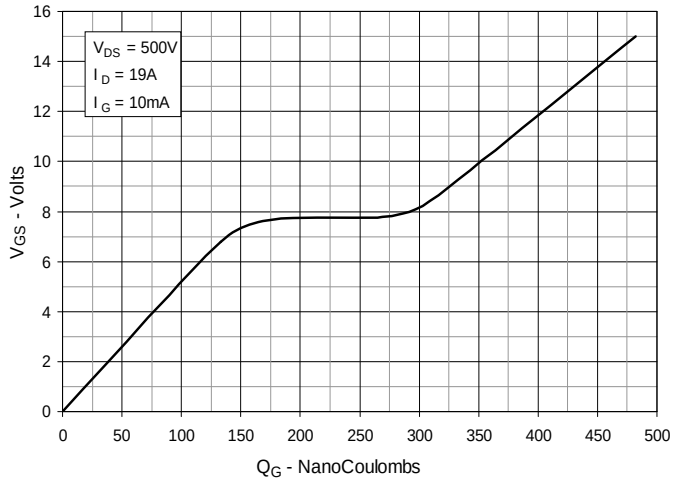

Fig. 11. Capacitance

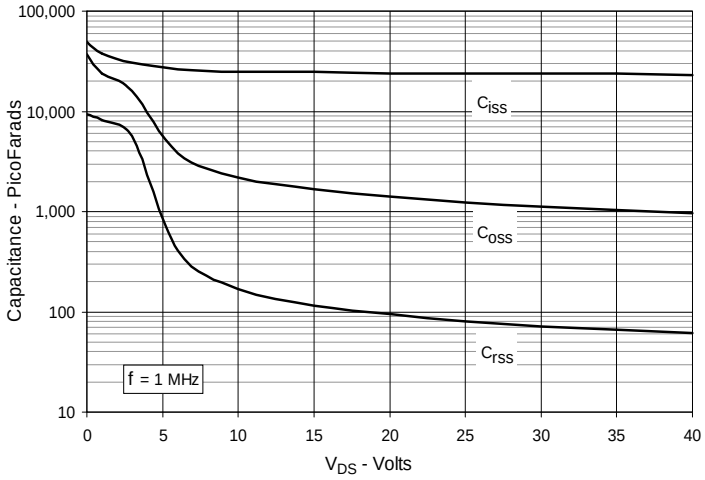

Fig. 12. Forward-Bias Safe Operating Area

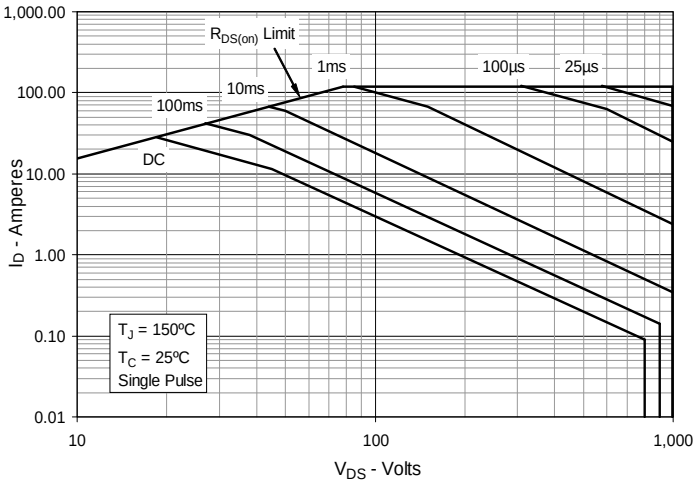

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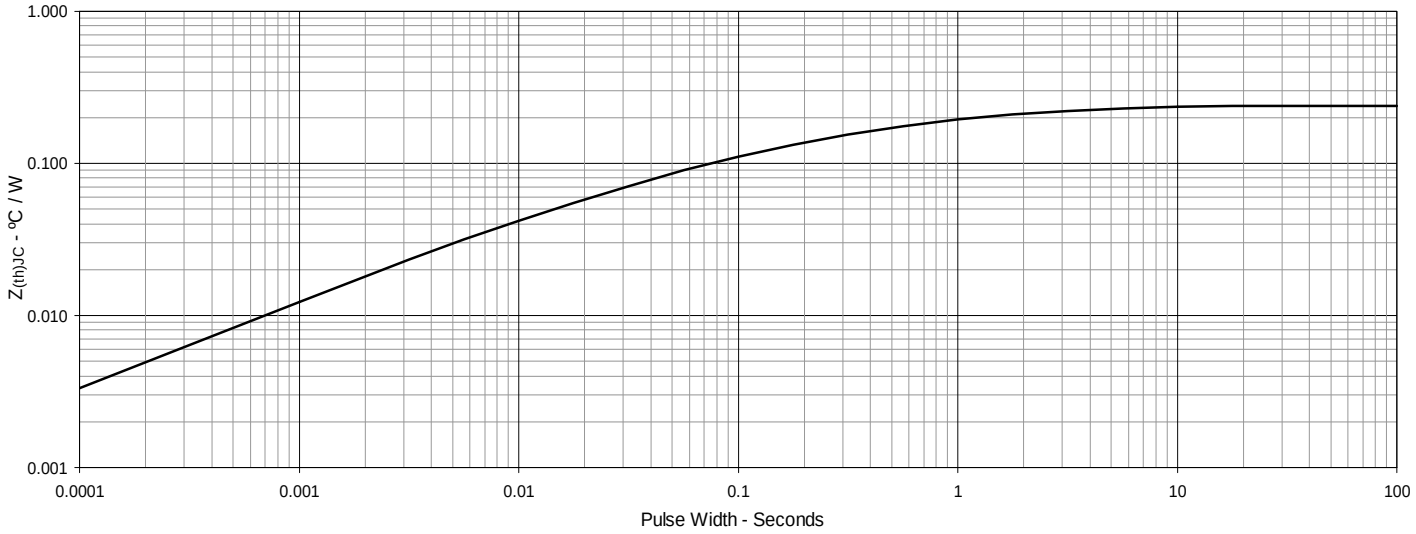
Fig. 13. Maximum Transient Thermal Impedance



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